

REMARKS

Allowed claims 1-4 and 6-26 are cancelled and have been substantially refiled in U.S. Patent Application No. 11/428,081, filed today, which is a continuation of the present application.

New claims 37-48 are presented and are identical to claims 1, 3, 9, 11, 33, 34, 17, 19, 25, 27, 35, and 36, respectively, as previously presented by this application following the entry of an Amendment filed on December 17, 2004, except that new claims 40, 44, and 46 correct typographical errors in former claims 11, 19, and 27. No new matter is entered. With this Preliminary Amendment, new claims 37-48 are the pending claims; new claims 37 and 43 are independent claims, and the remaining new claims depend, directly or through intervening claims, from these 2 claims.

For purposes of the prosecution of this patent application only, Applicant states that some or all of the claims that will be pending in this application upon the entry of this Preliminary Amendment were previously presented in this Application, and were pending herein prior to July 6, 2005, and may be considered to interfere with some or all of the claims of U.S. Patent 6,759,984 to Wiersma upon the said pending claims herein being found otherwise allowable.

Claim Rejections: 35 U.S.C. § 102

Claims 37, 38, 41, 42, 43, 44, 47, and 48 (formerly 1, 3, 33, 34, 17, 19, 35, and 36) were rejected in the Office Action mailed July 27, 2005 under 35 U.S.C. § 102(b) as reciting subject matter anticipated by U.S. Pat. No. 6,107,970 to Holshouser et al.

Applicant will address first independent claims 37 and 43, corresponding to former claims 1 and 17 pending as of December, 2004. These claims are related; claim 37 is to an antenna comprising an element with specified characteristics, while claim 43 is to a mobile phone including an antenna comprising an element with the same characteristics.

Anticipation would be shown if Holshouser discloses a device that contains within itself all of the features of these claims. Applicant respectfully suggests that Holshouser discloses no such device, and hence that anticipation is not shown.

In previously rejecting these claims, the Examiner relied upon Figures 8A, 8B, 9A and 9B of Holshouser. Figures 8A and 8B disclose one device, while Figures 9A and 9B disclose a second device. Respectfully, Applicant suggests that neither of the devices disclosed by these Figures anticipates these claims.

The antenna element of claims 37 and 43 is formed from conductor patterns on a plurality of layers including *at least one buried layer* of a multilayer PCB, and the conductor patterns are *in stacked relation* and interconnected through the PCB.

It will be convenient to begin with the device disclosed in Figures 9A and 9B. Applicant respectfully suggests that this device does not anticipate Applicant's claims, in that Figures 9A and 9B illustrate (and the accompanying descriptive text at col. 7, line 57 to col. 8, line 21 describes) a device in which the antenna elements 42, 142 are configured *solely on the external faces* of the dielectric. (Traces 46a, 46b, 146a and 146b, which form the elements, are shown and described as being on the external faces 41a and 41b, and they are connected by edge plating strips 48 on the sides of the dielectric 40.) Figures 9A and 9B in no way suggest that any conductor pattern of the device is on a *buried layer* of a multilayer PCB, as Applicant's pending claims 37 and 43 require.

Turning now to the device set forth in Holshouser Figures 8A and 8B (described at col. 7, lines 24 to 56), it will be evident that this device does not anticipate Applicant's pending claims either. First, it will be convenient to consider antenna element 42. That element is shown explicitly in Figure 8A. Although the element is not explicitly identified in Figure 8B, it is also present in that Figure insofar as traces 46a and 46b, which form parts of it, are explicitly shown in Figure 8B. Antenna element 42 as shown in Figures 8A and 8B does not anticipate for a reason similar to that for the elements of

Figures 9A and 9B. Antenna element 42 of Figures 8A and 8B also is shown (and described) as being configured *solely* on the external faces of the dielectric. (Traces 46a and 46b, which form the element, are shown and described as being on the external faces 41a and 41b, and they are connected by edge plating strips 48 on the sides of the dielectric 40.) Thus, antenna element 42 of Figures 8A and 8B in no way suggests that any conductor pattern is on a *buried layer* of a multilayer PCB, as Applicant's pending claims 37 and 43 require.

That leaves only antenna element 142 of Figures 8A and 8B for consideration. Applicant respectfully suggests two independent reasons why that element does not anticipate Applicant's pending claims.

First, although Figures 8A and 8B show antenna element 142 (comprising traces 146a and 146b) *within* dielectric 40, neither those Figures nor the accompanying descriptive text states that at least one of the antenna traces which comprise the element is *on a buried layer*, as the Applicant's claims require. In Figures 8A and 8B, the antenna traces are shown floating in the interior of the dielectric 40, with no trace of structure shown. The accompanying text similarly says nothing about how the traces are placed or held there, or how they are related structurally to the dielectric. Although the specification describes the dielectric 40 as "multilayered" (col. 7, line 27), Figures 8A and 8B show a top surface layer and a bottom surface layer, and those two layers by themselves satisfy the "multilayered" description; Figures 8A and 8B do not show or refer to any "buried" layer in the interior. The specification describes element 142 as "disposed therewithin" with respect to the dielectric, (col. 7, line 40), and traces 146a and 146b as being "disposed *between* respective spaced-apart layers of the multi-layered dielectric member 40." (col. 7, lines 44-46) (Emphasis added.) There is no description of any antenna trace in antenna element 142 being on a buried layer. Hence, the "buried layer" aspect of Applicant's claims is not disclosed in Figures 8A and 8B.

Second, even if a “conductive pattern on a buried layer” somehow were considered to be disclosed by the illustration of antenna element 142 in Figures 8A and 8B, the structure of that antenna element fails to disclose the “the conductor patterns are in stacked relation” limitation of Applicant’s claims. The meaning of “stack” as used in Applicant’s claims is illustrated by Applicant’s Figure 3, which shows all of the multiple layers of a PCB disposed one above the other. This is consistent with the ordinary dictionary definition of a stack as a “pile of things more or less neatly arranged *one on top of another.*” (Encarta® World English Dictionary [North American Edition] ©2006 Microsoft Corporation.) (Emphasis added.) In Figures 8A and 8B, by contrast, the traces 146 a, 146b, ... which make up the antenna element 142 are *not* in such a relation. Half of those traces are at one height inside the dielectric 40, while the other half are at a second height inside the dielectric. Thus, the traces are not *stacked*. Moreover, although each trace *overlaps* the ends of two other traces, no trace has a trace directly above or below it, and of course no trace has all of the other traces above or below it.

This failure of element 142 to satisfy the “stacked” requirement is not an accident. The Holshouser specification describes the element 142 as being “helical” (col. 7, lines 40, 48, 50), and in such a structure in order to form the helix the elements must be offset from each other rather than stacked one above the other. (Although Holshouser states that a helical shape is not required, it does not suggest any other specific shape as an alternative, much less one in which the traces are stacked. (col. 7, lines 53-56))

Thus, Applicant has demonstrated that no device shown in Figures 8A, 8B, 9A or 9B of Holshouser contains all of the features in Applicant’s claims 37 and 43. It follows that those Figures do not anticipate those claims, and hence that Holshouser does not. Hence, those claims are allowable.

Insofar as Holshouser does not anticipate claims 37 and 43, it follows that it also does not anticipate claims 38, 41, 42, 44, 45 or 46, which depend directly or indirectly from claims 37 and 43. Hence, those claims also are allowable.

There is a further reason why Holshouser does not anticipate Applicant's claims 38 or 44. Those dependent claims require that the PCB be "apertured adjacent to the element." Even if one were to assume, contrary to what Applicant has demonstrated above, that element 142 of Figures 8A and 8B disclosed both the "buried layer" and the "stacked relation" features of Applicant's claims 37 and 43, the dielectric 40 in Figures 8A and 8B is not "apertured adjacent to the element." First of all, neither Figures 8A and 8B nor the accompanying description in the specification discloses any aperture at all in the element. The Examiner has previously asserted that the vias 149 which connect the ends 147a, 147b of the conductive traces 146a, 146b are in apertures in the dielectric, and that those apertures are adjacent to the element, but Applicant respectfully asks that the Examiner reconsider this conclusion. Even if the vias could be considered to be in apertures (and there is no disclosure of this structure in the specification), those apertures would not be *adjacent to* the element 142. The apertures of element 142 would be *in* the element itself, not adjacent to it. (The apertures would form, in effect, the proverbial hole "in" the doughnut which the element 142 forms. One does not speak of a hole being "adjacent to" a doughnut.) The distinction from Applicant's structure claimed in the pending claims 38 and 44 is clear. Applicant's Figure 3 illustrates the "hole" or slot 48 *adjacent to* conductor elements 43b, ...43h. The location of these holes is not *in* the conductor elements 43b, ...43h.

It follows for this additional reason that, even if, contrary to Applicant's demonstration above, the Examiner were to conclude that Holshouser anticipated claims 37 and 43, it still would not anticipate claims 38 and 44, and those claims would be allowable.

Claim Rejections: 35 U.S.C. § 103(a)

Claims 39, 40, 45, and 46 (formerly 9, 11, 25, and 27) were rejected in the Office Action mailed July 27, 2005 under 35 U.S.C. § 103(a) as reciting subject matter unpatentable over Holshouser et al. in view of U.S. Pat. No. 5,668,559 to Baro.

These claims depend from claims 37 or 43, and all add the additional feature of an antenna ground plane comprising a plurality of vias connecting ground plane regions on respective PCB layers. The Examiner recognized that Holshouser did not teach a ground plane conductor, and cited Baro for this additional structure. The addition of Baro, however, does not render the claims obvious, because, even assuming *arguendo* that Baro discloses the ground plane features of claims 39, 40, 45 and 46, the Examiner did not assert that Baro disclosed conductive patterns or traces in at least one buried layer, in a stacked relation, and hence the addition of Baro does not remedy the failure of Holshouser as the primary reference. It follows that these claims are allowable as well.

In addition, claims 40 and 46 are allowable for a further reason. Even if claims 37 and 43 are anticipated, as discussed above Holshouser does not anticipate claims 38 and 44, because those claims require that the dielectric be apertured adjacent to the element, and the devices in Figures 8A, 8B, 9A and 9B of Holshouser do not disclose that. Since the Examiner did not cite Baro for this feature, it follows that claims 40 and 46, which like claims 38 and 44 require the dielectric be apertured adjacent to the element, also are allowable.

Conclusion

Applicant respectfully suggests that pending claims 37-48, added to the application by this Preliminary Amendment, are in condition for allowance.

Respectfully submitted,

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By /sdeutsch/
Stephen B. Deutsch
Registration No.: 46,663
FOLEY HOAG LLP
155 Seaport Blvd
Boston, Massachusetts 02210
617-832-1134
Attorney for Applicant